# Technology Energy Management Plan Frederick County Interagency Information Technologies (IIT) April 14, 2008

## **Technology Strategic Goal #6: Technology Infrastructure**

1. By April 2008, develop an Energy Management Plan for Technology that establishes a baseline of the County's technology energy demands ensures adequate power to meet future needs and outlines initiatives to support the County's comprehensive energy plan.

# **Desktops - Laptops - Smart Clients (VDI)**

Objective

Reduce power consumption by implementing Smart Client desktop technology for low to mid use clients. Take advantage of power saving features for desktops and laptops. Long term objective will be to phase out the desktop for low to mid-level users in favor of thin clients and/or software as a service.

Low-use client: An employee who requires minimal connectivity to perform such tasks as filling out time sheets or minimal Internet usage

Mid-use client: An employee who uses basic office applications such as word processing, spreadsheets, e-mail and a browser

High-end user: An employee who uses resource intensive applications including, but not limited to Geographic Information Systems (GIS), development tools, ERP processing and advanced office tools.

- 1. Smart Clients (VDI Virtual Desktop Infrastructure)
- Requirements:
  - SAN storage space
  - VMWare Virtual Desktop
  - Smart Client / Thin Client
- Benefits
  - Power Savings due to no local hard drives, no external hardware ports (e.g. USB), no floppy drives.

## Accomplishment:

Smart Clients (VDI - Virtual Desktop Infrastructure)

- By June 30, 2008, IIT will be testing Thin Client / Smart Client on the network
- Adequate SAN storage exists for VDI testing with the purchase of the new storage modules
- Establish a test Virtual Desktop by fall 2008 working with consultant from Niksar Data Management
- 2. Green Desktops
- Modify desktop settings to enable all green mode functions
- Develop policy and enable sleep mode
- Review savings green PC vs a non green PC are there actual gains?

# Accomplishments:

# **Green Desktops**

- Additional research in progress through FY08
- Investigating impact and savings of remote PC shutdown after hours

#### Servers

## Objective

Reduce server power consumption through the use of energy smart (green) servers and server virtualization.

- 1. Green Servers
  - Purposed when an application needs its own server
  - Purposed when application will not run in a VMWare environment

# Accomplishment:

#### **Green Servers**

- Have purchased and ready to go into service
- 2. Power Servers utilizing VMWare ESX Operating System
  - High horsepower servers, maximized memory, CPU and disk space
  - Used for ESX VMWare
  - Goal is to obsolete 6 to 10 physical servers per ESX server

## Accomplishment:

Power Servers – utilizing VMWare ESX Operating System

• We now have 34 virtual servers running under 5 ESX physical servers The 5 ESX servers use a total wattage of 3,750 watts at peak use.

If we were to run the 34 virtual servers on actual hardware we would be using 24,140 watts at peak use.

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24,140 watts

-3,750 watts

20,390 watts – wattage we are "saving"
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20k x 365 x 24 = 175200KW
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Price per KWK = .08723 – this number can fluctuate come because of the power company charges for demands

175200KW \* .08723 = \$15,282.69 savings per year

#### **IP SAN**

Objective

Use our IP SAN technology coupled with Smart Clients to reduce power consumption throughout the county. The use of Smart Clients eliminates the personal PC hard drive.

## Accomplishment:

1. Preparing to test Virtual Desktop on IP SAN to understand potential savings.

#### **Printers**

#### Objective

Reduce energy usage by using Savin printers in place of multiple personal and network printers within the county.

#### 1. Local Printers

- Minimize local printers standard for getting a local printer, not within walking distance
  of a network printer or a multifunction printer.
- Research green printer models all-in-one printers

## Accomplishment:

#### **Local Printers**

- Replacing local printers with multi-function printers ongoing process
- Research Green Printer Models on-going research and evaluation

#### 2. Network Printers

- When printing volume does not justify a large workgroup multifunction
- Research green printer models all-in-one printers

## Accomplishment:

#### **Network Printers**

Research Green Printer Models – on-going research and evaluation

## 3. Multi-function Printers

Standard shared workgroup models to replace all printers where possible

## Accomplishment:

## **Multi-function Savin Printers**

 Accomplished – Review impact of cost savings and will standardize on two color models when contract is renewed in 5 years

## **Data Center**

# Objective

Reduce overall energy usage in the Data Center while providing the same level of service our customers have come to expect.

# 1. Lighting

• Install motion sensor switches in the Data Center.

## Accomplishment:

## Lighting

• Work order submitted.

## 2. Air Conditioning

- Rearrange server racks to maximize data center cooling.
- Install Inline Rack air conditioning.

# Accomplishment:

## Air Conditioning

- In process of rearranging the server racks to improve air flow within the Data Center.
- Retiring servers to decrease the heat flow and energy consumption in the Data Center.
- Working with APC on Inline Rack air conditioning design. Requested funding via a Data Center Capital Improvement Project.

# 3. Power Management

• Measure ongoing power usage for the entire data center at Winchester Hall.

# Accomplishment:

 Submitted work order for permanent placement of power measuring equipment at Winchester Hall